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(FILE 'HOME' ENTERED AT 09:15:59 ON 19 SEP 2006)
FILE 'REGISTRY' ENTERED AT 09:16:08 ON 19 SEP 2006

L1 23 S 60-23-1 OR 60-24-2 OR 74-93-1 OR 78-10-4 OR 107-03-9 OR 107-96-0
OR 109-79-5 OR 111-31-9 OR 111-88-6 OR 112-55-0 OR 112-90-3 OR 143-
10-2 OR 507-09-5 OR 928-98-3 OR 1191-08-8 OR 1191-43-1 OR 1191-62-4
OR 1455-21-6 OR 1892-29-1 OR 2079-95-0 OR 2757-37-1 OR 2885-00-9 OR
2917-26-2

L2 20 S 3446-89-7 OR 3489-28-9 OR 4420-74-0 OR 5332-52-5 OR 6954-27-4 OR
13373-97-2 OR 14814-09-6 OR 14866-33-2 OR 17689-17-7 OR 19484-26-5
OR 30774-15-3 OR 31521-83-2 OR 33528-63-1 OR 34451-26-8 OR 55453-
24-2 OR 65062-26-2 OR 69839-68-5 OR 71310-21-9 OR 73391-27-2 OR
74328-61-3

L3 14 S 82001-53-4 OR 94805-33-1 OR 115646-13-4 OR 127087-36-9 OR 130727-
44-5 OR 156125-36-9 OR 157222-22-5 OR 171195-91-8 OR 176109-93-6 OR
178561-30-3 OR 186104-89-2 OR 186209-32-5 OR 216067-45-7 OR 558471-
93-5

FILE 'CA' ENTERED AT 09:17:20 ON 19 SEP 2006

L4 196541 S (PARTICLE OR PARTICULATE OR COLLOID? OR NANOPART? OR CLUSTER OR
NANOCRYST? OR NANOCLOUD? OR SOL OR NANOMATERIAL OR SUPERLATTICE)
(5A) (METAL OR METALLIC OR GOLD OR AU OR SILVER OR AG OR COPPER OR
CU OR PLATINUM OR PT OR PALLADIUM OR PD OR TIN OR SN OR NICKEL OR
NI)

L5 18953 S L4 (7A) (ENCAPSUL? OR MONOLAYER OR SAM OR SELFASSEMB? OR SELF
ASSEMB? OR PROTECT? OR TERMINAT? OR CAPPED OR CAPPING (1A) LAYER OR
PASSIVAT? OR FUNCTIONALI? OR COATED OR COATING)

L6 9530 S L4 AND (THIOL OR ALKANETHIOL OR THIOPHENE OR THIOLATE? OR LIGAND
OR DITHIOL OR ALKANETHIOLATE OR ALKANEDITHIOL? OR
ALKYLSILOXANETHIOL?)

L7 3149 S L4 AND L1-3

L8 485 S L4 AND (PROPANEETHIOL? OR TRIDECANETHIOL? OR THIOPHENEETHANETHIOL?
OR THIENYL (1W) DODECANETHIOL? OR MERCAPTOPROPANOIC OR DECANETHIOL?
OR PENTANEDITHIOL? OR NONANEDITHIOL? OR MERCAPTOHEXADECANOIC OR
MERCAPTOUNDECANOIC OR HYDROXYETHYL (1W) DISULFIDE OR MERCAPTOETHANOL
OR MERCAPTOHEXANOIC)

L9 1258 S L4 AND (METHANEETHIOL? OR DODECYLTHIOL? OR ETHANEETHIOIC OR
MERCAPTOPROPYL (1W) TRIMETHOXYSILANE OR DODECANETHIOL? OR OLEYLAMINE
OR NONANEETHIOL? OR TETRAOCTYLAMMONIUM OR OCTANEETHIOL? OR
OCTANEDITHIOL? OR HEXANEETHIOL? OR UNDECANEETHIOL? OR TRIETHOXYSILYL
(1W) PROPANEETHIOL?)

L10 402 S L4 AND (DODECYL (1W) DISULFIDE OR OCTADECANEETHIOL OR
MERCAPTOBENZOATE OR MERCAPTOPROPYLTRIMETHOXYSILANE OR
HEXANEETHIOL? OR XYLENEDITHIOL? OR DODECANEDITHIOL? OR
PERFLUOROHEXYL (1W) ETHANEETHIOL? OR MERCAPTOUNDECANOATE OR
MERCAPTOOCTANOIC OR MERCAPTOODECANOIC OR MERCAPTO (1W) DECANOL)

L11 204 S L4 AND (HEXADECANEETHIOL OR BUTANEETHIOL? OR BIPHENYLDITHIOL? OR
BENZENEDIMETHANEETHIOL? OR THIOETHANOLAMINE OR
METHYLMERCAPTOBENZALDEHYDE OR BUTANE DITHIOL? OR TETRADECANEETHIOL?
OR EICOSANEETHIOL?)

L12 1082 S L6-11 AND (METAL OR METALLIC OR GOLD OR AU OR SILVER OR AG OR
COPPER OR CU OR PLATINUM OR PT OR PALLADIUM OR PD OR TIN OR SN OR
NICKEL OR NI OR SURFACE) (2A) (BOUND OR CONFINED OR IMMOBILI? OR
LINKED)

L13 1313 S L4 AND(SUBSTITUT? OR EXCHANG?) (2A) REACTION
L14 29661 S L4 AND(STABILI? OR AGGREGAT? OR (H₂O OR WATER) (1A) SOLUB?)
L15 2435 S L5 AND L6-11
L16 4261 S L12-13, L15
L17 1338 S L16 AND PY<1998
L18 226 S L14 AND L17
L19 936 S L17 AND(GOLD OR AU OR SILVER OR AG OR COPPER OR CU OR PLATINUM OR PT OR PALLADIUM OR PD OR TIN OR SN OR NICKEL OR NI)
L20 703 S L19 NOT CATALY?
L21 204 S L20 AND(ENCAPSUL? OR MONOLAYER OR SAM OR SELFASSEMB? OR SELF ASSEMB? OR PROTECT? OR TERMINAT? OR CAPPED OR CAPPING(1A)LAYER OR PASSIVAT? OR FUNCTIONALI? OR LINKED)
L22 387 S L18, L21
L23 332 S L22 NOT(TETRATHIA OR HEXANUCLEAR OR TRINUCLEAR OR SILVER SULFIDE OR DINUCLEAR OR GROUP 11 OR DECANUCLEAR OR J AGGREGA? OR FE2)
L24 4 S L22 NOT L23 AND SELF
L25 280 S L23 NOT(POLYACRYL? OR HORMONE OR COBALT OR DECAPP? OR SIEVE OR PIGMENT OR BREAST OR SUPERPARA? OR KETEN? OR BIOTIN OR OCTAHED?)
L26 3 S L23 NOT L25 AND SELF ASSEMBL?
L27 241 S L25 NOT(CADMUM OR MOLYBDENUM OR OSMIUM OR WASTE OR WATER PURIF? OR METAL COMPLEX OR PICKLING)
L28 7 S L25 NOT L27 AND(LAYER(1W)LAYER OR CHEMISOR? OR AU CLUSTER)
L29 211 S L27 NOT(PYRROLE OR PHTHALO? OR POLYMER COMPOSITE OR SUB OR H₂ D₂ OR HYDROGEN DEUTERIUM OR SULFOBENZYL OR DOMAIN OR LAMINAT?)
L30 2 S L27 NOT L29 AND CAPPED
L31 157 S L29 NOT(XEROGEL OR FERRIC OR RUBEANIC OR MONOXIDE OR IRON OR SIO₂ COATING OR CYTOCHROME OR COKING OR POLEMIC OR RHODIUM OR ZEOLITE OR GALLIUM OR POLYASPAR? OR SOLGEL OR SOL GEL)
L32 2 S L29 NOT L31 AND(ELECTRONIC CONDUCTION OR UNDER MONOLAYER)
L33 133 S L31 NOT(PBO₂ OR ALKALI METAL OR LIPOSOME OR NAFION OR ANHYDRIDE OR RAIN OR ORGANIC MATTER OR BAR CODE OR ION EXCHANGE OR TITANIUM OR POLYAZO OR METALLOPOR? OR COLORATION)
L34 151 S L24, L26, L28, L30, L32-33

=> d bib,ab l34 1-151

L34 ANSWER 17 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 127:226691 CA
TI pH dependent changes in the optical properties of carboxylic acid derivatized **silver colloidal particles**
AU Sastry, Murali; Mayya, K. S.; Bandyopadhyay, K.
CS Materials Chemistry Division, National Chemical Laboratory, Pune, 411 008, India
SO Colloids and Surfaces, A: Physicochemical and Engineering Aspects (1997, July), 127(1-3), 221-228
AB The optical properties of **Ag colloidal particles** derivatized using an arom. bifunctional mol., 4-carboxythiophenol, are presented. The capping mol. forms a **thiolate** bond with the **Ag colloidal particle** yielding a carboxylic acid terminal **functionality** which may then be charged to varying degrees by controlling the **Ag** hydrosol pH. A progressive red shift together with a damping and broadening of the surface plasmon feature (λ_{max}) of the **Ag particles** is obsd. as the pH is reduced 10-3. **Ag colloidal particles** with high surface coverage of the

bifunctional mol. showed negligible flocculation with time at high soln. pH indicating good **stabilization** due to Coulombic repulsive interactions. At low pH, considerable flocculation was obsd. even for high surface coverage due to lack of Coulombic **stabilization**. A tentative explanation is put forward to explain changes in the optical properties of the colloidal particles due to variation in the pH dependent surface charge of the particles.

L34 ANSWER 18 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 127:213551 CA
TI Single-electron transistor using a molecularly **linked gold colloidal particle chain**
AU Sato, Toshihiko; Ahmed, Haroon; Brown, David; Johnson, Brian F. G.
CS Hitachi Cambridge Lab., Cavendish Lab., Hitachi Europe Ltd., Cambridge,
CB3 0HE, UK
SO Journal of Applied Physics (1997), 82(2), 696-701
AB By applying a **dithiol** (1,6-hexanedithiol) treatment, it was obsd. that a submonolayer of **gold colloidal particles** deposited by using an aminosilane adhesion agent [i.e., 3-(2-aminoethylamino) propyltrimethoxysilane] transform themselves into chains consisting of a few **gold colloidal particles**. In those chains, **gold colloidal particles** are believed to be **linked** by alkane chains derived from the **dithiol** mols. The particle chain was formed on an SiO₂ substrate with source, drain, and gate metal electrodes defined by electron beam lithog. It was obsd. that the **gold particle** chain bridged a gap between the source and drain forming a single-electron transistor with a multi-tunnel junction in the particle chain. The electron conduction through the chain exhibited a clear Coulomb staircase and the periodic conductance oscillation as a function of gate voltage. These measurement results corresponded closely to the results of a simulation based on the orthodox theory.

L34 ANSWER 21 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 127:167265 CA
TI On the **Stability** of Carboxylic Acid Derivatized **Gold Colloidal Particles**: The Role of **Colloidal** Solution pH Studied by Optical Absorption Spectroscopy
AU Mayya, K. S.; Patil, V.; Sastry, Murali
CS Materials Chemistry Division, National Chemical Laboratory, Pune, 411 008, India
SO Langmuir (1997), 13(15), 3944-3947
AB Results of an investigation into the influence of hydrosol pH on the optical properties of **gold colloidal particles capped** with a novel arom. bifunctional mol., 4-carboxythiophenol (4-CTP), are presented. Changes in the optical properties of the carboxylic acid derivatized clusters have been interpreted as arising due to flocculation of the clusters and quantified using a "flocculation parameter" C. Weisbecker et al. (1996). It is obsd. that there is a large fall in the flocculation parameter above hydrosol pH = 4 which then is const. above pH = 7. This indicates that the cluster distribution is very stable at high pH due to complete charging of the clusters and maximization of the repulsive electrostatic interaction. Contact angle titrn. measurements on a **self-assembled monolayer** of 4-CTP on **gold** revealed an analogous trend with the contact

angle falling above pH = 6 and then remaining const. above pH = 8. This indicates that **monolayer** formation of 4-CTP on planar and curved surfaces is similar. However, these results are at variance with earlier similar studies on carboxylic acid **functionalized alkanethiols** where a decrease in the flocculation parameter was obsd. for intermediate pH values (3 to 7) C. Weisbecker et al. (1996) and a possible explanation is presented.

- L34 ANSWER 24 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 127:88465 CA
TI Observation of a Coulomb staircase in electron transport through a molecularly **linked** chain of **gold colloidal particles**
AU Sato, T.; Ahmed, H.
CS Hitachi Cambridge Laboratory, Hitachi Europe Limited, Cambridge, CB3 0HE, UK
SO Applied Physics Letters (1997), 70(20), 2759-2761
AB Submonolayer **gold colloidal particles** were deposited by using aminosilane [3-(2-aminoethylamino)propyltrimethoxysilane] as an adhesion agent on the substrate. These submonolayer particles transform themselves into short chains of a few **gold colloidal particles** after a subsequent **dithiol** (1,6-hexanedithiol) treatment and an addnl. **gold colloidal particle** deposition. These chains bridged a gap that was formed between source and drain metal electrodes defined by electron beam lithog.; thus realizing a quasi one dimensional current path between the source and drain. The device exhibited a clear Coulomb staircase at both 4.2 and 77 K.
- L34 ANSWER 33 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 126:298027 CA
TI Synthesis of Highly Monodisperse **Silver Nanoparticles** from AOT Reverse Micelles: A Way to 2D and 3D Self-Organization
AU Taleb, A.; Petit, C.; Pileni, M. P.
CS Laboratoire SRSI URA CNRS 1662, Universite P. et M. Curie, Paris, 75005, Fr.
SO Chemistry of Materials (1997), 9(4), 950-959
AB A simple method is used to prep. highly monodispersed **silver nanoparticles** in the liq. phase, which starts from an initial synthesis in **functionalized** AOT reverse micelles. To narrow the particle size distribution from 43% to 12.5% in dispersion, the particles are extd. from the micellar soln. The size-selected ptn. method is used. The decrease in polydispersity of the **silver nanoparticles** is followed by transmission electron microscopy, by UV-vis spectroscopy, and by small-angle X-ray scattering. The nanocrystallites dispersed in hexane are deposited on a support. A **monolayer** made of nanoparticles with spontaneous hexagonal organization is obsd. The immersion of the support on the soln. yields to the formation of organized multilayers arranged as microcrystals in a face-centered cubic structure.
- L34 ANSWER 46 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 126:123065 CA
TI **Alkanethiol** Molecules Containing an Aromatic Moiety **Self-Assembled** onto **Gold Clusters**
AU Johnson, S. R.; Evans, S. D.; Mahon, S. W.; Ulman, A.

CS Department of Physics and Astronomy and School of Materials, Leeds University, Leeds, LS2 9JT, UK
SO Langmuir (1997), 13(1), 51-57
AB Alkanethiol mols. contg. a polar arom. group (C₂₂H₄₅-SO₂-C₆H₄-O-C₄H₈-SH) were used to stabilize Au clusters formed in a 2-phase system (M. Brust et al., 1994). The Au nanoparticles were studied by using TEM, FTIR, UV/visible, and XPS and compared to a monolayer formed from the same alkanethiol mol. on a planar surface. Surfactant-coated nanoparticles indeed are formed and the incorporation of a polar arom. group into the thiol mol. does not hinder the self-assembling process.

L34 ANSWER 47 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 126:123056 CA
TI Chemical deposition of silver nanoclusters on self-assembled organic monolayers. A strategy to contact individual molecules
AU Grummt, U.-W.; Geissler, M.; Schmitz-Huebsch, Th.
CS Institut fuer Physikalische Chemie der Friedrich-Schiller-Universitaet Jena, Lessingstrasse 10, D 07743 Jena, Germany
SO Chemical Physics Letters (1996), 263(3,4), 581-584
AB Self-assembled monolayers (SAMs) on Au (111) surfaces were prep'd. consisting of a matrix of 1-dodecanethiol and a mercaptan as a host which was terminated by a 4-electron reducing agent. Upon treatment with ammoniated AgNO₃ solns., Ag nanoclusters are generated on the SAM surface. Phys. development allows enlargement of the clusters.

L34 ANSWER 48 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 126:111585 CA
TI Self-assembly of a quantum dot superlattice using molecularly linked metal clusters
AU Mahoney, W. J.; Bielefeld, J. D.; Osifchin, R. G.; Andres, R. P.; Henderson, J. I.; Kubiak, C. P.
CS School Chemical Engineering, Purdue University, West Lafayette, IN, 47907, USA
SO Proceedings of the Science and Technology of Atomically Engineered Materials, Richmond, Oct. 30-Nov. 4, 1995 (1996), Meeting Date 1995, 57-65. Editor(s): Jena, Puru; Khanna, Shiv N.; Rao, B. K. Publisher: World Scientific, Singapore, Singapore.
AB We report on a synthesis strategy for fabrication of close-packed planar arrays of nanometer-diam. metal clusters that are covalently linked by org. mol. wires. The clusters are gold single crystals, each encapsulated by a monolayer of dodecanethiol mols. A colloidal suspension of these clusters in mesitylene is spread onto a flat, insulating substrate. On evapn. of the mesitylene the clusters self-assemble to form a close-packed monolayer. This two-dimensional cluster array is crosslinked by immersing it in an acetonitrile soln. contg. conjugated di-thiol or di-isocyanide mols. which serve as mol. wires. They displace some of the dodecanethiol mols. and form well defined tunnel junctions between adjacent clusters. This crosslinked network is a two-dimensional superlattice of metal quantum dots. When the clusters used to synthesize the network have diams. <2 nm, it is predicted that this superlattice will exhibit Coulomb blockade effects at room temp.

- L34 ANSWER 50 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 126:81412 CA
TI Fabricating Surface Enhanced Raman Scattering (SERS)-active substrates by assembling **colloidal Au nanoparticles** with **self-assembled monolayers**
AU Wang, J.; Zhu, T.; Tang, M.; Cai, S. M.; Liu, Z. F.
CS Cent. Intelligent Mater. Res., Peking Univ., Beijing, 100871, Peop. Rep. China
SO Japanese Journal of Applied Physics, Part 2: Letters (1996), 35(10B), L1381-L1384
AB A simple method for fabricating SERS-active substrates with **colloidal Au nanoparticles** is reported. Spontaneous adsorption of HSCH₂CH₂NH₂ on Au-evapd. glass led to a **self-assembled monolayer** with an amino-terminated surface, on which mono-dispersed **colloidal Au nanoparticles** were assembled into a two-dimensional array. Thus-prepd. substrates are SERS-active, evidence by the enhanced Raman scattering from BPE and an azobenzene deriv. The SERS enhancement factor is 3 × 10³. Raman mapping and AFM imaging disclosed the good uniformity of the particle distribution on the surface on micrometer scale.
- L34 ANSWER 54 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 125:257889 CA
TI The **self-assembly** of gold and SCd **nanoparticle** multilayer structures studied by quartz crystal microgravimetry
AU Brust, M.; Etchenique, R.; Calvo, E. J.; Gordillo, G. J.
CS INQUIMAE, Univ. de Buenos Aires, Buenos Aires, 1428, Argent.
SO Chemical Communications (Cambridge) (1996), (16), 1949-1950
AB The **self-assembly** of nanometer-sized **Au** and **CdS particles** to well defined multilayer structures on **dithiol** derivatized **Au** surfaces is quant. studied by quartz crystal microgravimetry.
- L34 ANSWER 56 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 125:189921 CA
TI A DNA-based method for rationally assembling nanoparticles into macroscopic materials
AU Mirkin, Chad A.; Letsinger, Robert L.; Mucic, Robert C.; Storhoff, James J.
CS Dep. Chem., Northwestern Univ., Evanston, IL, 60208, USA
SO Nature (London) (1996), 382(6592), 607-609
AB **Colloidal particles** of **metals** and **semiconductors** have potentially useful optical, optoelectronic and material properties that derive from their small (nanoscopic) size. These properties might lead to applications including chem. sensors, spectroscopic enhancers, quantum dot and nanostructure fabrication, and microimaging methods. A great deal of control can now be exercised over the chem. compn., size and polydispersity of colloidal particles, and many methods have been developed for assembling them into useful **aggregates** and materials. Here we describe a method for assembling **colloidal gold nanoparticles** rationally and reversibly into macroscopic **aggregates**. The method involves attaching to the surfaces of two batches of 13-nm **gold particles** non-complementary DNA oligonucleotides **capped** with **thiol** groups, which bind to **gold**. When we add to the soln. an oligonucleotide duplex with 'sticky ends' that are complementary to the two grafted sequences, the nanoparticles **self-assemble** into **aggregates**. This

assembly process can be reversed by thermal denaturation. This strategy should now make it possible to tailor the optical, electronic and structural properties of the colloidal **aggregates** by using the specificity of DNA interactions to direct the interactions between particles of different size and compn.

L34 ANSWER 57 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 125:178469 CA
TI **Nanocrystal gold molecules**
AU Whetten, Robert L.; Khouri, Joseph T.; Alvarez, Marcos M.; Murthy, Srihari; Vezmar, Igor; Wang, Z. L.; Stephens, Peter W.; Cleveland, Charles L.; Luedtke, W. D.; Landman, Uzi
CS Sch. Phys. Chem., Georgia Inst. Technol., Atlanta, GA, 30332, USA
SO Advanced Materials (Weinheim, Germany) (1996), 8(5), 428-33
AB **Au nanocrystals passivated by self-assembled monolayers** of straight-chain alkylthiolate mols. were obtained as highly purified mol. materials of high intrinsic **stability**. Evidence is presented for a predicted discrete sequence of energetically optimal fcc. structures of a truncated octahedral morphol. motif. The nanocrystal materials have a propensity to form extended superlattices.

L34 ANSWER 62 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 125:124691 CA
TI Infrared Spectroscopy of Three-Dimensional **Self-Assembled Monolayers: N-Alkanethiolate Monolayers on Gold Cluster Compounds**
AU Hostetler, Michael J.; Stokes, Jennifer J.; Murray, Royce W.
CS Kenan Laboratories of Chemistry, University of North Carolina, Chapel Hill, NC, 27599-3290, USA
SO Langmuir (1996), 12(15), 3604-3612
AB Transmission IR spectroscopy was used to probe the structure of **alkanethiolate monolayers** adsorbed onto nanometer-sized **gold clusters**. The alkyl chain lengths vary between **propanethiolate** and **tetracosanethiolate**; specifically the C3, C4, C5, C6, C7, C8, C10, C12, C16, C20, and C24 **alkanethiolates** were exampd. as solid suspensions in KBr pellets. It was found that the smaller chain lengths (C3, C4, and C5) are relatively disordered, with large amts. of gauche defects present, and thus most resemble the free alkanes in the liq. state. The longer length **alkanethiolates** are predominantly in the all trans zigzag conformation. There are detectable amts. of near surface gauche defects, the amt. of which decreases with increasing chain length, and a reasonably high percentage of end-gauche defects, the relative amt. of which increases with increasing chain length. Internal gauche defects cannot be detected. A model is proposed to explain these observations, and the data are compared with that collected for **alkanethiolates self-assembled** onto the more traditional two-dimensional systems.

L34 ANSWER 63 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 125:124551 CA
TI Room temperature Coulomb blockade and Coulomb staircase from **self-assembled** nanostructures
AU Andres, R. P.; Datta, S.; Dorogi, M.; Gomez, J.; Henderson, J. I.; Janes, D. B.; Kolagunta, V. R.; Kubiak, C. P.; Mahoney, W.; et al.
CS Sch. CHem. Eng., Purdue Univ., West Lafayette, IN, 47907, USA

- SO Journal of Vacuum Science & Technology, A: Vacuum, Surfaces, and Films (1996), 14(3, Pt. 1), 1178-1183
- AB The **self-assembly** of well-characterized, nanometer-size **Au clusters** into ordered **monolayer** arrays spanning several microns was achieved. Techniques to insert mol. wires to link adjacent clusters in the **self-assembled** array were developed. "Unit cell" nanostructures formed from individual **Au clusters** supported on a **self-assembled monolayer** film of the double-ended **thiol** mol. p-xylene- α,α' - dithiol show evidence for reproducible single electron effects at room temp. when studied by STM. Ests. for the elec. resistance of a single mol. can be obtained from these measurements. The exptl. values for this resistance are in reasonable agreement with theor. calcns. by using the Landauer approach.
- L34 ANSWER 67 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 125:45892 CA
TI "Coulomb staircase" at room temperature in a **self-assembled** molecular nanostructure
AU Andres, Ronald P.; Bein, Thomas; Dorogi, Matt; Feng, Sue; Henderson, Jason I.; Kubiak, Clifford P.; Mahoney, William; Osifchin, Richard G.; Reifenberger, R.
CS Sch. Chem. Eng., Purdue Univ., West Lafayette, IN, 47907, USA
SO Science (Washington, D. C.) (1996), 272(5266), 1323-1325
AB Double-ended aryl **dithiols** [α,α' -xylyldithiol (XYL) and 4,4'-biphenyldithiol] formed **self-assembled monolayers (SAMs)** on **gold(111)** substrates and were used to tether nanometer-sized **gold clusters** deposited from a **cluster** beam. An ultrahigh-vacuum scanning tunneling microscope was used to image these nanostructures and to measure their current-voltage characteristics as a function of the sepn. between the probe tip and the **metal cluster**. At room temp., when the tip was positioned over a cluster bonded to the XYL **SAM**, the current-voltage data showed "Coulomb staircase" behavior. These data are in good agreement with semiclassical predictions for correlated single-electron tunneling and permit estn. of the elec. resistance of a single XYL mol. ($\sim 18 \pm 12 \text{ M}\Omega$).
- L34 ANSWER 68 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 125:21025 CA
TI **Self-assembled monolayers** of **dithiols**, diisocyanides, and isocyanothiols on **gold**: 'chemically sticky' surfaces for covalent attachment of **metal clusters** and studies of interfacial electron transfer
AU Henderson, Jason I.; Feng, Sue; Ferrence, Gregory M.; Bein, Thomas; Kubiak, Clifford P.
CS Department of Chemistry, 1393 Brown Laboratory, Purdue University, West Lafayette, IN, 47907, USA
SO Inorganica Chimica Acta (1996), 242(1-2), 115-24
AB The prepns. is reported of **self-assembled monolayers (SAMs)** of the double-ended **dithiols** 4,4'-biphenyldithiol and α,α' -p-xylyldithiol; the double-ended diisocyanides 1,4-phenylenediisocyanide, 4,4'-biphenyldiisocyanide, 4,4'-p-terphenyldiisocyanide, 1,6-diisocyanohexane, 1,12-diisocyanododecane, and 1,4-di(4-isocyanophenylethynyl)-2-ethylbenzene; and a 4-sulfidophenylisocyanide-capped trinuclear **Ni cluster** by direct adsorption or by displacement of

a pre-existing **SAM** of 1-octadecanethiol on Au. The **SAMs** were characterized by using reflection-absorption IR spectroscopy (RAIR), optical ellipsometry, and advancing contact-angle (θ_a) measurements. The substitution chem. of **SAMs** was irreversible. The **dithiols** and aryl diisocyanides formed **SAMs** with only 1 functional group attached to the surface. The **SAMs** of **dithiols** were used to covalently attach nanometer-scale **Au clusters** to the exposed thiol surface of the **SAM**. STM was used to image these **immobilized Au clusters**. The diisocyanides were used to covalently anchor trinuclear **Ni clusters**. The **SAM** of the 4-sulfido Ph isocyanide-capped trinuclear nickel cluster 4-(μ_3 -iodo)-tris(bis(diphenylphosphino)methane)-trinickel-(isocyanato)phenylenesulfide, was studied by cyclic voltammetry. The electron acceptors methylviologen (MV_2^+) and the Me ester of cobaltoceneum $[CoCpCpCOOMe] + [PF_6^-]$ were used to demonstrate rectification in the interfacial electron transfer from **Ni cluster SAM-modified Au electrodes** to the electron acceptors.

L34 ANSWER 71 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 124:329180 CA
TI Synthesis of a quantum dot **superlattice** using molecularly **linked metal clusters**
AU Osifchin, R. G.; Mahoney, W. J.; Bielefeld, J. D.; Andres, R. P.; Henderson, J. I.; Kubiak, C. P.
CS School of Chemical Engineering, Purdue University, West Lafayette, IN, 47907, USA
SO Superlattices and Microstructures (1995), 18(4), 283-9
AB We report on a synthesis strategy for fabrication of close-packed planar arrays of nanometer-diam. **metal clusters** that are covalently **linked** by org. mol. wires. The **clusters** are **gold** single crystals, each **encapsulated** by a **monolayer** of **dodecanethiol** mols. A colloidal suspension of these clusters in mesitylene is spread onto a substrate. On evapn. of the solvent the clusters **self-assemble** to form a close-packed **monolayer**. This cluster network is then crosslinked by immersing the substrate in an acetonitrile soln. contg. a conjugated di-isonitrile mol. (1,4-di(4-isocyanophenylethynyl)2-ethylbenzene). Transmission electron micrographs of the cluster arrays before and after immersion indicate that the diisonitrile mols. partially substitute for the **dodecanethiol** mols. to produce a crosslinked network of clusters joined by the di-isonitrile. The interesting feature of this network is that it represents a 2D **superlattice** of **metal** quantum dots coupled by well defined tunnel junctions. When the **gold clusters** used to synthesize the network have diams. less than approx. 2 nm, it is predicted that this superlattice will exhibit Coulomb blockade effects at room temp.

L34 ANSWER 72 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 124:329179 CA
TI Electronic conduction through 2D arrays of nanometer diameter **metal clusters**
AU Janes, D. B.; Kolagunta, V. R.; Osifchin, R. G.; Bielefeld, J. D.; Andres, R. P.; Henderson, J. I.; Kubiak, C. P.
CS School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN, 47907, USA
SO Superlattices and Microstructures (1995), 18(4), 275-82

AB An exptl. study of elec. conduction through arrays of nanometer-diam. **metallic clusters linked** by org. mols. is presented. **Gold clusters**, having diams. of ~4 nm and **encapsulated** by a **monolayer** of **dodecanethiol**, are deposited from soln. on to specially prepnd. substrates to form a close-packed cluster **monolayer**. Nearest-neighbors in this 2D array of **encapsulated** clusters are then covalently **linked** using a conjugated org. mol. approx. 2.2 nm in length having isocyanide groups at both ends. In order to allow both elec. characterization and TEM imaging, the cluster arrays are deposited in 500 nm wide gaps between **gold** contacts on a free standing, insulating SiO₂ film. **Electronic conduction** through **linked** 2D arrays approx. 80 clusters in length has been obsd. at room temp. The structure of the arrays and current-voltage relationships for the **linked** arrays are presented.

L34 ANSWER 74 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 124:271470 CA

TI **Self-assembled monolayers on gold nanoparticles**

AU Badia, Antonella; Singh, Shanti; Demers, Linette; Cuccia, Louis; Brown, G. Ronald; Lennox, R. Bruce

CS Dep. Chem., McGill Univ., Montreal, QC, H3A 2K6, Can.

SO Chemistry--A European Journal (1996), 2(3), 359-63 Published in: Angew. Chem., Int. Ed. Engl., 35(5)

AB Phase properties in self-assembled **monolayers (SAMs)** have been addressed here through the synthesis of **gold nanoparticles** of 20-30Å in diam. and fully covered with alkylthiol chains. These **thiol-modified gold nanoparticles** with large surface areas have enabled the **monolayer** film structure to be uniquely characterized by transmission FT-IR spectroscopy, NMR spectroscopy, and differential scanning calorimetry. Our studies reveal that for long-chain **thiols** (\geq C16), the alkyl chains exist predominantly in an extended, all-trans ordered conformation at 25°C. Furthermore, calorimetry, variable temp. transmission FT-IR spectroscopy, and solid-state ¹³C NMR studies have established that a cooperative chain melting process occurs in these alkylated **metal colloids**. How this arises is not immediately evident, given the relation between the extended chain conformation and the geometry of the spherical nanoparticles. Transmission electron microscopy () reveals that adjacent **gold particles** are sepnd. by approx. one chain length; this suggests that chain ordering arises from an interdigititation of chains on neighboring particles. The thermotropic behavior is sensitive to the alkyl chain length and chain packing d. The alkylated nanoparticles can thus serve as a highly dispersed analog to the much-studied planar **SAMs**.

L34 ANSWER 81 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 124:42310 CA

TI Novel **gold-dithiol** nano-networks with non-metallic electronic properties

AU Brust, Matias; Bethell, Donald; Schiffrin, David J.; Kiely, Christopher J.

CS Dep. Chem., Univ. Liverpool, Liverpool, L69 3BX, UK

SO Advanced Materials (Weinheim, Germany) (1995), 7(9), 795-7

AB Two new prepn. techniques are reported leading to composite materials, which comprise nanometer sizes **Au particles** **self-assembled** into a 3-dimensional network by org. **dithiols**. **Au clusters** with **particle size** of

2.2 nm were prep'd. in a 2-phase liq.-liq. system with di-Et ether as solvent and with **1,5-pentanedithiol**, **1,6-hexanedithiole**, and **p-xylylenedithiole** as **stabilizing ligands**. Colloids with a size of 8 nm were prep'd. using toluene as solvent without **thiol** and a subsequent reaction with the **dithiols**. The electronic properties are nonmetallic and adjustable via particle size and interparticle spacing depending on the **dithiol**.

L34 ANSWER 83 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 124:16132 CA
TI First steps towards ordered **monolayers of ligand-stabilized gold clusters**
AU Peschel, Stefanie; Schmid, Guenter
CS Inst. Anorg. Chem., Univ., Essen, D-45117, Germany
SO Angewandte Chemie, International Edition in English (1995), 34(13/14), 1442-3
AB The authors synthesized largely ordered **monolayers of ligand-stabilized Au₅₅ clusters** for the 1st time by **self-assembly** with the aid of polyelectrolytes. The [Au₅₅(PPh₃)₁₂Cl₆] cluster could be used, so the PPh₃ **ligand** was replaced with PPh₂(m-C₆H₄SO₃H). A freshly prep'd. layer of polyethylenimine (PEI) on mica was immersed in a soln. contg. the Au₅₅ clusters and the strong interaction between imino and sulfonic groups yielded a strongly adhering **monolayer**. The AFM images indicated relatively closely packed layers with < 5 % of the surface uncovered or disordered. These structures can be used to study electronic transitions in 2-dimensional quantum dot arrangements sep'd. by **ligand shells** (spaced 1.4 nm apart). The authors' method can also be used to fabricate sandwich structures since the Au₅₅ cluster **monolayer** can be coated with PEI.

L34 ANSWER 86 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 123:94218 CA
TI Organization of **Au Colloids as Monolayer** Films onto ITO Glass Surfaces: Application of the **Metal Colloid** Films as Base Interfaces To Construct Redox-Active **Monolayers**
AU Doron, Amihood; Katz, Eugenii; Willner, Itamar
CS Institute of Chemistry, Hebrew University of Jerusalem, Jerusalem, 91904, Israel
SO Langmuir (1995), 11(4), 1313-17
AB **Gold colloid** films are organized on In Sn oxide (ITO) surfaces by using (aminopropyl)siloxane or (mercaptopropyl)siloxane as base **monolayer** for the deposition of the **metal colloid**. Different **Au colloids** (ranging in **particles** of diams. 25, 30, 35, and 120 nm) were deposited on the **monolayer**-modified ITO surfaces. For the small **particles** (25 nm), an almost continuous **Au colloid** film is formed with interparticle spacing of 10-25 nm. The surface coverage of the **Au colloid** on the (aminopropyl)siloxane **monolayer** is higher than that for the (mercaptopropyl)siloxane-modified ITO. The **Au colloid** films provide active surfaces for the **self-assembly** of redox-active **thiolate monolayers**. 8-(N-Methyl-4,4'-bipyridinyl)octanoic acid was covalently linked to a cystamine **monolayer** assembled on the **Au colloids**. For the 25 nm **Au colloid**, the surface coverage by the redox active unit (6.8 x

10-10 mol cm⁻²) is ~ 12-fold higher than that of the (aminopropyl) siloxane **monolayer**-modified ITO (lacking the Au film). The surface coverages of the **Au colloid** films by the bipyridinium **monolayers** increase as the colloid particle sizes decrease.

L34 ANSWER 87 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 123:18732 CA
TI **Self-assembled metal colloid monolayers:** an approach to SERS substrates
AU Freeman, R. Griffith; Grabar, Katherine C.; Allison, Keith J.; Bright,
Robin M.; Davis, Jennifer A.; Guthrie, Andrea P.; Hommer, Michael B.;
Jackson, Michael A.; Smith, Patrick C.; et al.
CS Division Science, Northeast Missouri State University, Kirksville, MO,
63501, USA
SO Science (Washington, D. C.) (1995), 267(5204), 1629-31
AB The **self-assembly** of monodisperse **Au** and **Ag** **colloid particles** into **monolayers** on polymer-coated substrates yields macroscopic surfaces that are highly active for surface-enhanced Raman scattering (SERS). Particles are bound to the substrate through multiple bonds between the **colloidal metal** and functional groups on the polymer (e.g., cyanide (CN), amine (NH₂), **thiol** (SH)). Surface evolution (which can be followed in real time by UV-visible spectroscopy and SERS) can be controlled to yield high reproducibility on both the nanometer and the centimeter scales. On conducting substrates, colloid **monolayers** are electrochem. addressable and behave like a collection of closely space microelectrodes. These favorable properties and the ease of **monolayer** construction suggest a widespread use for **metal colloid-based** substrates.

L34 ANSWER 89 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 122:320132 CA
TI **Gold Particulate Film Formation under Monolayers**
AU Yi, Kyunghee C.; Mendieta, Victor Sanchez; Castanares, Rafael Lopez;
Meldrum, Fiona C.; Wu, Changjun; Fendler, Janos H.
CS Department of Chemistry, Syracuse University, Syracuse, NY, 13244-4100,
USA
SO Journal of Physical Chemistry (1995), 99(24), 9869-75
AB **Gold nanoparticulate** films were generated **under monolayers**, prep'd. from octadecyl mercaptan (1), N,N'-dioctadecyl-N,N'-dithioethylammonium bromide (2), and N,N'-dioctadecyl-N,N'-dimethylammonium bromide (3), by the exposure of aq. HAuCl₄ to carbon monoxide and to steady-state irradn. by a 150-W xenon lamp. Absorption spectrophotometric and transmission electron microscopic investigations of the **gold particulate** films, transferred to solid substrates, indicated the marked influence of the surfactants used to form the **monolayer**. Those prep'd. **under monolayer** 1 had a broad absorption max. at 580 nm and diams. between 3 and 50 nm. Those formed **under monolayer** 2 were highly dense and had an absorption max. at 564 nm. **Gold particles** formed **under monolayer** 3 had a narrow size distribution with a mean diam. of 10 nm and had a broad absorption max. at 574 nm. Annealing the **gold particulate** films at high temp. decreased their absorption bandwidth and shifted their max. to higher energy.

L34 ANSWER 92 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 122:139658 CA
TI Ultra-thin particulate films prepared from **capped** and uncapped reverse-micelle-entrapped **silver particles**
AU Meldrum, Fiona C.; Kotov, Nicholas A.; Fendler, Janos H.
CS Dep. Chem., Syracuse Univ., Syracuse, NY, 13244-4100, USA
SO Journal of the Chemical Society, Faraday Transactions (1995), 91(4), 673-80
AB The formation of thin **particulate** films from **silver nanoparticles**, generated by the sodium borohydride redn. of aq. **silver nitrate** within aerosol-OT [AOT; sodium bis(2-ethyl-1-hexyl) sulfosuccinate] reverse micelles in 2,2,4-trimethylpentane(isooctane), is described. The **silver nanoparticles** were dispersed on a water subphase in a Langmuir trough and the structure of the ultra-thin films formed was investigated by using Brewster-angle microscopy (BAM), transmission electron microscopy (TEM) and reflectivity measurements. **Silver nanoparticles** were also successfully 'capped' by **octadecanethiol** and, after isolation, could be readily redispersed in chloroform. The ultra-thin **particulate** films of the **capped silver nanoparticles** were highly uniform and displayed excellent reproducibility, while the films formed from the reverse-micelle solns. were somewhat less reproducible.

L34 ANSWER 95 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 121:120062 CA
TI Competitive **self-assembly** and electrochemistry of some ferrocenyl-n-**alkanethiol** derivatives on **gold**
AU Creager, Stephen E.; Rowe, Gary K.
CS Department of Chemistry, Indiana University, Bloomington, IN, 47405, USA
SO Journal of Electroanalytical Chemistry (1994), 370(1-2), 203-11
AB Three ferrocenyl-**alkanethiol** derivs. with different functional groups linking ferrocene to an **alkanethiol** chain were synthesized and characterized electrochem. in bulk soln. and in **self-assembled monolayer** films on **gold** electrodes. Relative affinities of the ferrocenyl-**alkanethiols** and of the corresponding n-**alkanethiols** for the electrode surface were evaluated by the competitive **self-assembly** method. The affinity of the ferrocenyl-**alkanethiols** for the surface, relative to that of the corresponding **alkanethiols**, is a function of the polarity of the functional group linking ferrocene to the **alkanethiol** chain. In general, nonpolar linking groups (methylene) show a stronger affinity for the surface than do polar groups (carboxamides) and esp. charged groups (quaternary ammonium salts). It is postulated that electrostatic effects are critically important during **self-assembly**. Redox potentials for the 3 ferrocenyl-**alkanethiol** derivs. scale approx. with the electron donating/withdrawing effects of the functional groups on the cyclopentadiene rings. However, redox potentials for the **surface-confined** mols. are consistently more pos. than for the identical mols. in bulk soln.

L34 ANSWER 96 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 121:8262 CA
TI Palladium(0)-catalyzed substitution of allylic substrates in an aqueous-organic medium
AU Blart, Errol; Genet, Jean Pierre; Safi, Mohamed; Savignac, Monique;

- Sinou, Denis
CS Lab. Synth. Org., Ec. Natl. Super. Chim. Paris, Paris, 75231, Fr.
SO Tetrahedron (1994), 50(2), 505-14
AB A **palladium(0)-water sol.** catalyst prep'd. *in situ* from **palladium acetate** and the sulfonated triphenylphosphine P(C₆H₄-m-SO₃Na)₃ (or tppts) is an efficient catalyst for allylic substitution with various carbon and heteronucleophiles in an aq.-org. medium, allowing for a very easy sepn. of the product(s) and the recycling of the catalyst.
- L34 ANSWER 101 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 119:284752 CA
TI Solid state magic angle spinning carbon-13 and phosphorus-31 NMR of organic **ligand stabilized** high nuclearity **metal clusters**. 13C and 31P MAS on **metal cluster** compounds
AU Kolbert, A. C.; de Groot, H. J. M.; van der Putten, D.; Brom, H. B.; de Jongh, L. J.; Schmid, G.; Krautscheid, H.; Fenske, D.
CS Gorlaeus Lab., Leiden Univ., Leiden, 2300 RA, Neth.
SO Zeitschrift fuer Physik D: Atoms, Molecules and Clusters (1993), 26 (Suppl.), 24-6
AB 13C and 31P solid state NMR measurements on the org. **ligands** in ligated Au₅₅, Ni₈, Pt₃₀₉, Cu₃₆ and Cu₇₀ clusters are reported. The **ligands** behave like diamagnetic org. mols., giving rise to relatively narrow lines with excellent cross-polarization efficiency. The resonance lines of the nuclei directly **bound** to the **metal** core are systematically broadened in the conducting compds. No pronounced Knight shifts or evidence of metallic-like relaxation were obsd. These results support a model for the elec. conduction involving tunneling between metal cores with the **ligands** playing the role of a tunneling barrier.
- L34 ANSWER 102 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 119:279701 CA
TI Preparation of ordered colloid **monolayers** by electrophoretic deposition
AU Giersig, Michael; Mulvaney, Paul
CS Abt. Photochem., Hahn-Meitner Inst., Berlin, W-1000, Germany
SO Langmuir (1993), 9(12), 3408-13
AB Citrate- and **alkanethiol-stabilized** Au **colloids** were deposited electrophoretically on carbon-coated Cu grids. The colloid particles form ordered **monolayers**, and the core-to-core interparticle spacing is detd. by the size of the alkane chains on the **stabilizers** used in the prepn. of the sols. In the case of longer alkane chains, some interpenetration of the chains occurs when the **Au particles** form **monolayers**. When the **Au sols** are **stabilized** by Na 3-thiopropionate, they can be coagulated and peptized reversibly by cycling the pH between 3 and 7. The method was used to form ordered **monolayers** and bilayers of latex particles.
- L34 ANSWER 120 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 115:182381 CA
TI A new supported palladium catalyst for the partial hydrogenation of cyclodienes
AU Wang, Yuan; Liu, Hanfan
CS Inst. Chem., Chin. Acad. Sci., Beijing, 100080, Peop. Rep. China
SO Fenzi Cuihua (1991), 5(2), 189-92

LA Chinese
AB A novel thioether-contg. silica-supported metallic palladium catalyst was prep'd. via the coordination capture of polymer-protective palladium metal colloid with silica gel bearing thioether ligands. The catalyst shows high catalytic activity, stability and good selectivity for the partial hydrogenation of cyclodienes to monoenes; for example, the catalytic activity in hydrogenation of cyclopentadiene is 10-100 times higher than those of other supported catalysts reported in literature. This high catalytic activity is believed to be due to the fact that immobilization via coordination capture can create favorable conditions for easy access to the substrates, preventing the colloidal particles from aggregating and thus forming a well dispersed catalyst. The selectivity to cyclopentene reached 99%, and a 100% selectivity for the partial hydrogenation of cis,cis-1,3-cyclooctadiene was obtained. Narrowly dispersed ultrafine palladium metal particles with the modification of anchored thioether ligands is thought responsible for catalyst selectivity. During the course of catalytic reaction, the amts. of metal leaching are within the magnitude of ppb, and the total turnover nos. are larger than 80000. Furthermore, this new route for catalyst prepn. via coordination capture of metal colloids provides an approach to controlling or adjusting the particle size of metal particles within 1-10 nm. This makes possible the inspection of the influences of different sulfur-contg. groups anchored on supported surface on the catalytic behaviors. In the partial hydrogenation the highest selectivity and activity were obtained when the n-Pr thioether ligand was used. It can be expected that the new route for catalyst prepn. will play an important role in the study of the interaction between the metal particles and supports.

L34 ANSWER 121 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 115:145371 CA
TI Optical plasmon losses in stabilized gold (Au55) clusters
AU Fauth, K.; Kreibig, U.; Schmid, G.
CS Univ. Saarlandes, Saarbruecken, W-6600, Germany
SO Zeitschrift fuer Physik D: Atoms, Molecules and Clusters (1991), 20(1-4), 297-300
AB Au55 cluster compds. were investigated by optical spectroscopy and TEM. The optical spectra appear to be rather structureless, neither showing a collective excitation resonance nor exhibiting distinct absorption bands known from lower nuclearity clusters. Discussed are changes of the electronic properties compared to larger Au clusters affecting both, 6sp electrons and 5d-6sp interband transitions, the cluster-ligand-interaction being considered as a charge transfer process. A low temp. instability was obsd. in the cluster compd., which results in changed optical extinction spectra. A characteristic absorption feature at $\lambda = 400$ nm is attributed to small, ligand-free Au cluster fragments.

L34 ANSWER 122 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 114:93957 CA
TI Molecular structure of $\{[Ag_{13}(\mu-SC_5H_9NHMe)_16]^{13+}\}_n$, a novel one-dimensional nonmolecular silver-thiolate
AU Casals, Isidre; Gonzalez-Duarte, Pilar; Sola, Joan; Vives, Josep; Font-

CS Bardia, Merce; Solans, Xavier
SO Dep. Quim., Univ. Auton. Barcelona, Barcelona, 08193, Spain
Polyhedron (1990), 9(5), 769-71

AB The polymeric structure of $\{[Ag_{13}(\mu-L)_{13}]^{13+}\}_n$ ($HL = 1\text{-methylpiperidine-4-thiol}$) contains $Ag_{10}S_{16}$ units linked by 3 Ag atoms. Each unit consists of a central $Ag_6(\mu-L)_6$ core and 2 $Ag_4(\mu-L)_4$ rings and comprises diagonal, trigonal, and tetrahedral Ag and doubly- and triply-bridging S atoms. Crystal structure is triclinic, space group P.hivin.1, $a = 21.129(4)$, $b = 20.383$, $c = 15.172(3)$ Å, $\alpha = 121.59(3)$, $\beta = 114.53(4)$, $\gamma = 96.21(3)$ °, $Z = 9$, $R = 0.093$, and $R_w = 0.096$.

L34 ANSWER 130 OF 151 CA COPYRIGHT 2006 ACS on STN
AN 109:103547 CA

TI Large transition metal clusters-VI. Ligand exchange reactions on the gold triphenylphosphine chloro cluster, $Au_{55}(PPh_3)_{12}Cl_{16}$ - the formation of a water soluble gold (Au₅₅) cluster

AU Schmid, Guenter; Klein, Norbert; Korste, Ludger; Kreibig, Uwe; Schoenauer, Detlev

CS Inst. Anorg. Chem., Univ. Essen, Essen, D-4300/1, Fed. Rep. Ger.

SO Polyhedron (1988), 7(8), 605-8

AB $Au_{55}(PPh_3)_{12}Cl_{16}$ is sol. in org. solvents like pyridine or CH_2Cl_2 but decomp. rapidly, thus precluding crystal growth and other studies. Exchange of PPh_3 in $Au_{55}(PPh_3)_{12}Cl_{16}$ by $Ph_2PC_6H_4SO_3Na$ takes place quant. and yields stable water-sol. $Au_{55}(Ph_2PC_6H_4SO_3Na \cdot 2H_2O)_{12}Cl_{16}$. Mol. wt. detns. and cond. measurements in H_2O show that the cluster is completely dissociated into $12Na^+$ and $[Au_{55}(Ph_2PC_6H_4SO_3)_{12}Cl_{16}]^{12-}$. From such aq. solns. very small, probably cryst. particles are obtained which can, in the dried state, be obsd. in the transmission electron microscope using a 100 kV electron beam. Images are given that show columns or layers of cluster mols. with a distance of 2.1 ± 0.1 nm. The diams. of a cluster mol. including the ligand shell and of the naked cluster are calcd. as 2.2 ± 0.1 and $1.3-1.4$ nm, resp. The cluster mols. forming the layered structures are intact. This is the 1st time that M₅₅ clusters could be imaged with an intact ligand shell by TEM. Earlier microscopic studies with a 400 kV beam gave high resoln. images of the cluster nuclei only.

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